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CFETP 2A4X2 (453X2)  
Parts I and II  
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# AFSC 2A4X2 (453X2)

## AIRCRAFT COMMUNICATION AND NAVIGATION SPECIALTY



## CAREER FIELD EDUCATION AND TRAINING PLAN



AIRCRAFT COMMUNICATION/NAVIGATION SPECIALTY  
AFSC 2A4X2 (453X2)  
CAREER FIELD EDUCATION AND TRAINING PLAN

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## **PREFACE**

A highly trained, and motivated enlisted work force is the Air Force's key resource in meeting challenges of the future. The Career Field Education and Training Plan (CFETP) for AFSC 2A4X2, Aircraft Communication/Navigation Maintenance Specialty provides management with the framework and guidance necessary for planning, developing, managing, and conducting career field education training programs. This plan provides a "training guide" for the career field that identifies mandatory and optional skill level training individuals must receive during their career progression.

The CFETP consists of two parts. Part I provides information necessary for overall management of training in the career field. It contains administrative details, CFETP purpose and use, specialty descriptions, suggested career field progression, general career field information, training decisions, skill level requirements, and resource constraints. Part II of the CFETP contains the Specialty Training Standard (STS), Air Force Job Qualification Standard Index, and Training Course Index. MAJCOMs may attach Air Force/Command Job Qualification Standards (AF/CJQSs) to this plan. Supervisors and trainers at the unit level will use part II of the CFETP to identify, plan, and conduct unit level training commensurate with the overall goals of this plan.

The CFETP identifies the specific training individuals must receive during each phase of their career. This plan will enable Aircraft Communication/Navigation Systems personnel to keep pace with the future technological advances within the career field.

## ABBREVIATIONS/TERMS EXPLAINED

**Advanced Training.** Formal course which provides individuals who are already fully qualified in their Air Force Specialty (AFS) with additional skills/knowledge to enhance their expertise in the career field. Training is for selected career airmen at the advanced level of an AFS.

**Air Force Core Tasks.** Tasks that the Air Force functional managers identify as minimum qualification requirements within an Air Force specialty.

**Career Field Education and Training Plan (CFETP).** A comprehensive, multipurpose document encapsulating the entire spectrum of education and training for an Air Force Specialty Code (AFSC). It outlines a logical growth path, including training resources, and is designed to eliminate duplication and make training identifiable, cost effective, and budget defensible.

**Continuation Training.** Additional training exceeding minimum upgrade requirements with emphasis on present or future duty assignments.

**Enlisted Specialty Training (EST).** A mix of formal training and informal training to qualify and upgrade airmen in each skill level of a specialty.

**Exportable Training.** Additional training via computer assisted, paper text, interactive video, or other necessary means to supplement training.

**Initial Skills Training.** A formal school that results in award of a 3-skill level AFSC.

**Instructional System Development (ISD).** A deliberate and orderly process for developing, validating and reviewing instructional programs that ensure personnel are taught the knowledge and skills, essential for successful job performance.

**On-the-Job Training (OJT).** Hands-on, over-the-shoulder training at the duty location used to certify personnel for both skill level upgrade and duty position qualification.

**Qualification Training.** Actual hands-on task performance training designed to qualify an airman in a specific duty position. This training program occurs both during and after the upgrade training process. It is designed to provide the performance skills/knowledge training required to do the job.

**Qualification Training Package (QTP).** An instructional course designed for use at the unit to qualify, or aid qualification, in a duty position or program, or on a piece of equipment. It may be printed, computer based, or in other audiovisual media.

**Resource Constraints.** Resource deficiencies, such as money, facilities, time, manpower, and equipment that preclude desired training from being delivered.

**Specialized Training Package and COMSEC Qualification Training Package.** A composite of lesson plans, test material, instructions, policy, doctrine, and procedures necessary to conduct training. These packages are prepared by Air Education and Training Command (AETC), approved by the National Security Agency (NSA), and administered by qualified Communication Security (COMSEC) maintenance personnel.

**Specialty Training Standard (STS).** An Air Force publication that describes an Air Force specialty in terms of tasks and knowledge which an airman is expected to perform or to know on the job. It serves as a contract between Air Education and Training Command and the functional user to show which of the overall training requirements for an Air Force Specialty Code and taught in formal schools, Career Development Courses (CDC), and exportable courses.

**Upgrade Training.** A mixture of mandatory courses, task qualification, QTPs and CDCs required for award of the 3-, 5-, 7-, or 9-skill level.

# PART I

## SECTION A - GENERAL INFORMATION

**1. Purpose of the CFETP.** This CFETP provides the information necessary for functional managers, training management, supervisors, and trainers to plan, develop, manage, conduct and evaluate a very effective, productive and efficient career field education and training program. The plan outlines specific training individuals in AFSC 2A4X2 should receive in order to develop and progress throughout their career. This CFETP:

- a. Ensures established training is provided at the appropriate point in an individuals career.
- b. Identifies task and knowledge training requirements for each skill level in the specialty and recommends training throughout an individuals career.
- c. Lists training courses available in the specialty and identifies potential sources of the training.
- d. Identifies major resource constraints which impact implementation of the desired career field education and training program.

**2. Use of the CFETP.** This plan will be used by career field training managers at all levels to ensure a comprehensive and cohesive training programs are developed for each individual step in the career ladder.

a. AETC training personnel will develop/revise formal resident, non-resident, Field Training Detachment (FTD) and exportable training based upon requirements established by the users and documented in Part II of the CFETP. They will also work with the Air Force career field manager to develop acquisition strategies for obtaining the resources needed to provide the identified training.

b. The MAJCOM career field managers will ensure their training programs complement the CFETP mandatory initial skills and upgrade requirements. Identified requirements can be satisfied by OJT, resident training, contract training or exportable courses. MAJCOM developed training to support this AFSC, must be identified for inclusion in this plan and must not duplicate available training resources.

c. Qualification Training Packages (QTPs) are developed by AETC, MAJCOM career field managers and/or units. Unit-developed QTPs will be forwarded to their MAJCOM for approval and inclusion in the CFETP.

d. Each individual will complete the mandatory training requirements specified in this plan. The list of courses in Part II, Section C will be used as a reference to support training.

**3. Coordination and Approval.** MAJCOM representatives and AETC training personnel will identify and coordinate on the career field training requirements. The AETC training manager for AFSC 2A4X2 will initiate an annual review of this document by AETC and MAJCOM AFSC functional managers to ensure currency and accuracy. Using the list of courses in Part II, they will eliminate duplicate training. Applicable inputs will be routed to 332 TTS/TTOT, 613 Hangar Rd, Keesler AFB MS 39534-2237.

## SECTION B - CAREER FIELD PROGRESSION AND INFORMATION

### 1. Specialty Description.

a. **Aircraft Communication/Navigation Systems Apprentice and Journeyman.** Maintains, Aircraft Communication/Navigation systems at the organizational level. Inspects, modifies, services, and performs general aircraft handling procedures. Operates comm/nav systems by using proper controls and displays to determine operational condition. Identifies comm/nav systems malfunctions. Interprets equipment operational characteristics to isolate malfunctions through the use of software and test equipment. Traces data flow and wiring diagrams. Uses built-in test functions, electronic measuring equipment, aerospace ground equipment (AGE) and support equipment (SE). Removes, installs, aligns, and performs operational checks of comm/nav systems components. Repairs aircraft wiring and RF cables, performs modifications, maintains and posts entries on maintenance and inspection records. Records pertinent data on equipment maintenance data collection forms and enters data into automated systems. Recommends methods to improve equipment performance and maintenance procedures. Adheres to published safety guidelines and training requirements. Handle hazardous wastes according to environmental standards.

b. **Aircraft Communication/Navigation Systems Craftsman.** Performs and supervises maintenance on Aircraft Communication/Navigation systems at the organizational level. Monitors and analyzes equipment operating characteristics to isolate malfunctions in comm/nav systems and SE. Traces data flow and wiring diagrams. Inspects comm/nav systems to determine operational status. Interprets inspection findings and determines adequacy of corrective action. Reviews maintenance management publications procedures to obtain comm/nav systems information. Evaluates justification and practicality of modifications. Ensures compliance with published safety guidelines and provides training and task certification for skill level advancement.

c. **Aircraft Avionics Superintendent.** Manages maintenance and staff activities engaged in maintenance of aircraft. Plans, organizes, and manages maintenance troubleshooting activities of specialists and technicians to include calibration, repair, and modification of avionic systems, AGE, and SE. Inspects assembly, removal, installation, mechanical and electrical component adjustments. Coordinates with base agencies to improve procedures and resolve problems. Establishes priorities for completion of maintenance tasks and provides assistance in solving maintenance, supply, and personnel problems. Performs supervisory inspections of maintenance actions on mission systems and components. Determines operational status of aircraft systems, components, AGE, and SE. Interprets and discusses inspection findings and recommends corrective action. Interprets publications applicable to inspecting, maintaining, repairing, servicing, troubleshooting, modifying, overhauling, installing, and calibrating avionic systems, components, AGE, and SE. Evaluates aircraft and system failures to determine need to submit quality deficiency reports. Inspects aircraft records and reports. Interprets and establishes safety and training guidelines.

2. **Career Skill Progression.** Adequate training and timely progression from the apprentice to the superintendent skill level plays an extremely important role in the Air Force's ability to accomplish its mission. It is essential that everyone involved in training do their part to plan, develop, manage and conduct an effective training program. The guidance provided in this part of the CFETP will ensure each individual receives viable training at appropriate points in their career. The following narrative and the AFSC 2A4X2 Career Development Flow Charts identify the training career path.

a. **Apprentice (3-Level) Training:** Upon completion of initial skills training, a trainee will work with a trainer to enhance their knowledge and skills. They will utilize the career development course, task qualification training, and other exportable courses to progress in their career field.

b. Journeyman (5-Level) Training: Once upgraded to the 5-skill level, a journeyman will enter into continuation training. This will broaden their experience base. Five levels will be assigned job positions such as Consolidated Tool Kit (CTK), Technical orders, Due in From Maintenance (DIFM), and bench stock monitor. Individual will attend the Airman Leadership School (ALS) after having 48 months in the Air Force. After ALS, 5-levels will be considered for appointment as unit trainers. Individuals will use CDC to prepare for testing under the Weighted Airman Promotion System (WAPS). They should also consider continuing their education toward a CCAF degree.

c. Craftsman (7-Level) Training: An Aircraft Comm/Nav craftsman can expect to fill various supervisory and management positions such as shift leader, element chief, flight chief, and task certifier. Seven-levels should take courses or obtain added knowledge on management of resources and personnel. They will also be assigned to work in staff positions. Continued academic education through CCAF and higher degree programs are also encouraged. In addition, when promoted to TSgt, individuals will attend the Noncommissioned Officers Academy.

d. Superintendent (9-Level) Training: Upon selection to E-8, personnel will attend the Senior Noncommissioned Officer Academy (SNCOA). Job positions 9-levels will be assigned to may include, but are not limited to, production supervisor, superintendent, and weapon system/personnel functional manager.

**3. Training Decisions.** The CFETP was developed using a building block approach (simple to complex) to encompass the entire spectrum of training requirements for the Aircraft Communication and Navigation Systems career field. The spectrum includes a strategy for when, where and how to meet these training requirements. The strategy must ensure we develop affordable training, eliminate duplication and prevent a fragmented approach to training. The following training decisions were made at the Career Field Utilization and Training Workshop at Keesler AFB 17-24 Mar 93.

a. Initial skills. The following revisions were made to the 3-level course: Acquisition radar tasks were added to reflect the incorporation of 455X3, F-4 weapons control radar personnel into the 2A4X2 career field. Core Automated Maintenance System (CAMS) training was increased, Aerospace Ground Equipment (AGE) tasks were added, and the list of common test equipment expanded.

b. Five-Level Upgrade Training. The old 7-level CDCs were reaccomplished to update and expand training for the 5-level. Supplemental and FTD courses were reviewed and required changes were identified. Qualification Training Packages (QTPs) were identified to provide additional training/knowledge not taught through initial skills or upgrade training which is applicable to core tasks or the current duty positions.

c. Seven-Level Upgrade Training. A 7-level in-residence course was developed to provide in-depth training on system integration and advanced troubleshooting.

d. Continuation Training. Any additional knowledge and skill training requirements which were not taught through initial skills or upgrade training were assigned to continuation training. The purpose of the continuation training program is to provide additional training exceeding the minimum upgrade training requirements with emphasis on present and future duty positions. MAJCOMs will develop a continuation training program to ensure individuals in the Aircraft Communication/Navigation Specialty receive the necessary training at the appropriate point in their career. The program will identify both mandatory and optional training requirements.



- e. Detailed guidance for documentation of the STS was included in Part II of the CFETP.

**4. Community College of the Air Force (CCAF) Academic Programs.** Enrollment in CCAF occurs upon completion of basic military training. CCAF provides the opportunity to obtain an Associates in Applied Sciences Degree. In addition to its associates degree program, CCAF offers the following:

- a. Occupational Instructor Certification. Upon completion of instructor qualification training, consisting of an instructor methods course and supervised practice teaching, CCAF instructors who possess an associates degree or higher may be nominated by their school commander/commandant for certification as an Occupational Instructor.

- b. Trade Skill Certification. When a CCAF student separates or retires, a trade skill certification is awarded for the primary occupational specialty. The College uses a competency based assessment process for trade skill certification at one of four proficiency levels - Apprentice, Journeyman, Craftsman/Supervisor, or Master Craftsman/Manager. All are transcribed on the CCAF transcript.

- c. The Avionic Systems Technology (4VHS) program applies to AFSC 2A4X2. The skilled (5) level must be held at the time of program completion with degree requirements as follows:

	Semester Hours
Technical Education	
.....	24
Leadership, Management, and Military Studies	
.....	6
Physical Education	
.....	4
General Education	
.....	15
Program Elective	
.....	15
Technical Education; Leadership, Management Military Studies; General Education	
.....	64

(1) TECHNICAL EDUCATION (24 Semester Hours): A minimum of 12 semester hours of Technical Core subjects/courses must be applied and the remaining semester hours applied from Technical Core/Technical Elective subjects/courses. Requests to substitute subjects/courses must be approved in advance by the Technical Branch. Refer to the CCAF catalog for Application of Courses to the Technical Education area.

### Technical Core

Subjects/Courses	Semester Hours
Avionic Systems Theory/Maintenance	
.....	24
CCAF Internship	
.....	16

## Technical Electives

Subjects/Courses	Maximum Semester Hours
Advanced Electronics	12
AF Enlisted Professional Military Education	12
Algebra-Based Physics	4
Basic Electronics Theory/Applications	12
CAD/CAM or Technical Drawing/Drafting	3
Communication Systems Theory/Maintenance	12
Computer Science	6
Digital Techniques	6
Electronic Engineering Materials and Processes	3
Electronic Systems Theory/Maintenance	12
FCC General Radiotelephone Operator's License	9
High-Reliability Soldering	3
Industrial Safety	3
Metrology	6
Microprocessor Electronic Theory	6
Quality Assurance	3
Systems Theory/Maintenance	12
Solid State Theory/Applications	6
Technical Writing	3
Trigonometry	3

(2) LEADERSHIP, MANAGEMENT, AND MILITARY STUDIES (6 Semester Hours): Professional military education and/or civilian management courses. See the CCAF catalog for Application of Courses to the Leadership, Management, and Military Studies area.

(3) PHYSICAL EDUCATION (4 Semester Hours): Basic Military Training satisfies this requirement.

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(4) GENERAL EDUCATION (15 Semester Hours): Applicable courses must meet the Criteria for Application of Courses to the General Education Requirement (GER) and be in agreement with the definitions of applicable General Education subjects/courses provided in the CCAF catalog.

Subjects/Courses

Semester Hours

Oral Communication (Speech)

.....3

Written Communication (English Composition)

.....3

Mathematics

.....3

Intermediate algebra or a college-level mathematics course is required. If an acceptable mathematics course is applied as a Technical or Program Elective, a natural science course meeting general education requirements application criteria may be applied as a General Education Requirement.

Social Science

.....3

Anthropology, Archeology, Economics, Geography, Government,  
History, Political Science, Psychology, Sociology.

Humanities

.....3

Fine Arts(History, Criticism, and Appreciation),  
Foreign Language, Literature, Philosophy, Religion.

(5) PROGRAM ELECTIVE (15 Semester Hours): Satisfied with applicable Technical Education; Leadership, Management, and Military Studies; or General Education subjects/courses, including natural science courses meeting general education requirements application criteria. Six semester hours of CCAF degree-applicable technical credit, otherwise not applicable to this program, may be applied.

d. Additional off-duty education is encouraged for all. Airmen desiring to become an Air Training Command Instructor should be actively pursuing an associates degree. A degreed faculty is necessary to maintain accreditation through the Southern Association of Colleges and Schools.

**5. Career Field Flow Charts.** Charts depicting this career path are presented on page 10 and 11. The Career Path outlines when training is required for career progression within this specialty.

## 2A4X2 AIRCRAFT COMMUNICATION/NAVIGATION SPECIALTY 3-/5-LEVEL TRAINING FLOW

	Attend 3-level Technical School
	Award 3-level
9 Months 1 Year	Enroll in ▢ CDCs 12 - 18 months of Core Task Training
2 Years	Complete CDCs  Core Task Training Continued
3 Years	Complete Core Task Continuation Training  Promote to E-4 Award 5 Level  Continuation Training  Qualification Training
4 Years	Airman Leadership School  Trainer Duties

Note: Time-line is approximate

**2A4X2 AIRCRAFT COMMUNICATION NAVIGATION SPECIALTY  
7/9-LEVEL TRAINING FLOW**

6.5 Years	Selection for Promotion to E-5  Enter 7-level Training  Complete Core Task Training Exportable Courses (if Available)
8 Years	18 Months TIG as SSgt Eligible to attend 7-level Course
8.5 Years	Complete 7-Level In-Residence  Award of 7-level
11 Years	Selection for Promotion to E-6  Attend NCO Academy  Advanced Training Courses
18 Years	Selection for Promotion to E-8  Attend Senior NCO Academy Award of 9-Level

Note: Time-line is approximate

## **SECTION C -SKILL LEVEL TRAINING REQUIREMENTS**

**1. Purpose.** Define the various skill levels in terms of tasks and knowledge proficiency requirements for each skill level in the Aircraft Communication/Navigation Systems career field. They are stated in general terms and establish the standards of performance. Specific task and knowledge training requirements are identified in the STS in Part II, Section A, of the CFETP. Unit workcenters must develop a structural training program to ensure the following requirements are met.

### **2. Apprentice (3-Level).**

a. **Qualifications and Knowledge.** To perform duties at the 3-level, an airman must be able to understand basic systems operation and theory. In addition, airmen must be able to perform specific tasks as identified in the 2A4X2 STS. These tasks include: use technical data; perform operational checks; troubleshoot and repair system malfunctions; remove and install system LRUs; repair aircraft wiring, transmission lines, and connectors; and use support equipment and common hand tools.

b. **Training Sources.** The initial skills courses are focused to increase "hands-on" training and knowledge required by the 2A4X2 STS. Fundamental electronics is provided through course E3AQR30020-010, Common Electronic Training Program (CETP). Equipment related tasks and knowledge are taught in course E3ABR2A432-000, Apprentice Aircraft Communication/Navigation Systems.

c. **Implementation.** Upon graduation from Basic Military Training, the airman will be assigned to the training center where he/she will be enrolled in the Common Electronic Training Program (CETP). Upon completion, students will be enrolled in the Apprentice Aircraft Communication/Navigation Systems course. Completion of both courses will result in the award of the 3-skill level.

### **3. Journeyman (5-level).**

a. **Qualifications and Knowledge.** In addition to the 3-level qualification, an individual shall possess the knowledge and skills required to maintain comm/nav systems. A 5-level must be qualified on system theory of operation, analyzing, troubleshooting and correction of system malfunctions, system performance testing, inspection procedures, component removal/installation, and associated test equipment.

b. **Training Sources.** The 5-level CDC provides in-depth knowledge designed to support the enlisted specialty training. Qualification training and OJT will provide training and qualification on core tasks identified in the STS.

c. **Implementation.** Trainees will complete mandatory MAJCOM/unit training, CDC 2A452, all STS core tasks, and be promoted to E-4 prior to upgrade to the 5-level.

### **4. Craftsman (7-level).**

a. **Qualifications and Knowledge.** Aircraft Comm/Nav 7-levels shall possess the knowledge and skills required to: supervise personnel, inspect and certify completed maintenance actions, evaluate performance of subordinates, resolve complex technical problems, plan and schedule work assignments, and set work priorities. Seven-levels must also be able to analyze maintenance and inspection reports to detect and correct adverse maintenance trends; and plan, conduct and evaluate training.

b. Training Sources. Exportable training courses, STS core tasks, and the resident 7-level course will provide the job knowledge and hands-on training required by the STS. Other equipment related task and knowledge training is available through courses listed in Part II Section C of this CFETP.

c. Implementation. Qualified 7-level trainers will be assigned to train personnel on the core tasks identified in the 2A4X2 STS and enroll the trainee in required 7-level courses and MAJCOM training. Prior to attending the resident 7-level course, SSgts must complete all 2A4X2 core tasks, all 7-level exportable courses (when available), Airman Leadership School, and have a minimum of 18 months OJT as a SSGT. The 7-level AFSC will be awarded after graduation from the resident 7-level course.

## **5. Superintendent (9-Level).**

a. Qualifications and Knowledge: To perform duties at the 9-skill level, an individual must possess advanced skills and knowledge of concepts and principles of comm/nav systems. They must be qualified to efficiently manage and direct aerospace repairs, plan and organize resources, evaluate maintenance, interpret and resolve technical problems, analyze system/component failures and inspection results, and determine optimum management procedures and requirements.

b. Training Sources: The Senior NCO Academy, MAJCOM courses, and unit OJT will be used for 9-level upgrade training.

c. Implementation: Individuals will complete any MAJCOM required training and unit OJT for award of the 9-level. Individual will attend the Senior NCO Academy after they are selected from promotion to SMSgt.

## **SECTION D - RESOURCE CONSTRAINTS**

**1. PURPOSE.** This section of the CFETP identifies known resource constraints which preclude optimal/desired training from being developed or conducted. Included is a narrative explanation of each resource constraint, an impact statement describing the effect on training, the resources needed, and actions required to satisfy the training requirements.

### **2. TRAINING CONSTRAINTS.**

#### **a. Three-Level Training:**

(1) Constraint. Recommended changes to the 3-level course increase the training by approximately 8 days and increase instructor requirements by one.

(a) Impact. Lack of this training will increase the OJT burden at individual units while impairing production effectiveness.

(b) Resources Required. Increased funding to allow for the increase in training days and one additional instructor authorization.

(c) Action Required. Procure funding for AETC to include changes in training course and obtain one additional instructor authorization. (OPR: 332TTS/TTOT; HQ AETC/TTO; HQ AF/DPPE)

(2) Constraint. Two new flightline trainers are needed to provide realistic hands-on training for flightline avionics maintenance.

(a) Impact. Cannot provide required training on troubleshooting UHF, Interphone, VOR/ILS, Radar, TACAN, and IFF systems to qualify personnel to meet STS requirements.

(b) Resources Required. Two flightline trainers are needed to support training.

(c) Actions Required. Provide funding for trainers. In anticipation of this need, course and training services personnel have provided a preliminary design for trainers based on the KC-135 aircraft. With minor modifications, this design will meet the course's needs. Estimated cost to build the two trainers is \$40,000 each, for a total of \$80,000. The line replaceable units needed for the trainers are worth over \$200,000, however most of these can be obtained from the bone yard. It will require over a year to build the trainers. (OPR: 332 TTS/TTOT)

#### **b. Five-level Training. No constraints.**

#### **c. Seven-level Training.**

(1) Constraint. Two new flightline trainers are needed to provide realistic hands-on training in the 7-level course.

(a) Impact. Without the new trainers, training for troubleshooting of the Interphone and IFF systems will not meet the 3c level.



(b) Resources Required. Two flightline trainers are needed to provide realistic hands-on training on flightline avionics maintenance.

(c) Actions required. Provide funding for trainers. In anticipation of this need, course and training services personnel have provided a preliminary design for trainers based on the KC-135 aircraft. With minor modifications, this design will meet the course's needs. Estimated cost to build the two trainers is \$40,000 each, for a total of \$80,000. The line replaceable units needed for the trainers are worth over \$200,000, however most of these can be obtained from the bone yard. It will require over a year to build the trainers. (OPR: 332 TTS/TTOT)

d. Exportable Training.

(1) Constraint. Lack of suitable computers/hardware to support development and use of anticipated exportable computer assisted training in the training center, formal classroom, and field units.

(a) Impact. Development/use of exportable, computer assisted training would be limited without these resources, causing increased training time and further OJT burden.

(b) Resources Required. AETC will and units may require additional computers/hardware to support the development/use of exportable courses during tech school and at the field units.

(c) Action Required. Provide funding and procure computers/hardware for training support to develop and use exportable courses. (OPR: HQ ATC/TTO; 332 TTS/TTOT; OCR: MAJCOMS)

(2) Constraint. Lack of manpower authorizations to develop and maintain exportable courses required to support the STS and 7-level training.

(a) Impact. No exportable courses could be developed or maintained/updated without subject matter experts (SME) to perform work.

(b) Resources Required. SME authorizations to develop/update courses.

(c) Action Required. Obtain SME authorizations to develop exportable training. (OPR: 332 TTS/TTOT)

**PART II, SECTION A  
CAREER FIELD EDUCATION AND TRAINING PLAN**

**AIRCRAFT COMMUNICATION/NAVIGATION SYSTEMS  
SPECIALTY TRAINING STANDARD**

1. The implementation of this STS for training provided by Air Training Command is with the class entering 940405 and graduating 940910.

2. Purpose of this Specialty Training Standard (STS). As prescribed in AFR 8-13, this STS:

a. Lists in column 1 the tasks, knowledge, and technical references (TR) necessary for airmen to perform in the 3-, 5-, and 7-skill level AFSC in the Aircraft Communication/Navigation Systems career field. These are based on an analysis of the duties in AFR 39-1, effective 31 OCT 93.

b. Shows formal training requirements. Columns 2a and 2c show the level to which task/knowledge training has been accomplished by the Training Center for courses 2A432 3-level and 7-level courses, as described in AFR 50-5. When two codes are used in columns 2a and 2c, the first code is the established requirement for resident training on the task/knowledge, and the second code indicates the level of training provided in the course due to equipment shortages or other resource constraints.

c. Indicates in column 2b, the career knowledge provided in the 5-level CDC. See ECI/AFSC/CDC listing maintained by the unit EST manager for current CDCs.

d. Identifies in column 2d, exportable courses that will be used to enhance students knowledge during 5-level continuation training, 7-upgrade training, and 7-level continuation training.

e. Identifies in columns 3a and 3b, Air Force minimum core task training requirements for award of 2A452 and 2A472 AFSCs.

f. Provides in column 4, OJT certification columns to record completion of task and knowledge training requirements. Certification is accomplished IAW AFR 50-23 and as outlined below.

g. Is a guide for development of promotion tests used in the Weighted Airman Promotion System (WAPS). Specialty Knowledge Tests (SKT) are developed at the USAF Occupational Measurement Squadron by Senior NCOs with extensive practical experience in their career fields. The test samples knowledge of STS subject matter areas judged by test development team members to be the most appropriate for promotion to higher grades. Questions are based on the study references listed in the WAPS Catalog. Individual responsibilities are in AFR 35-8, Chapter 14.

h. Becomes a job qualification standard for OJT when placed in AF Form 623, On-The-Job Training Record, and used according to AFR 50-23. For OJT, the tasks in column 1

are trained and qualified to the go/no go level. "Go" means the individual can perform the task without assistance and meets local requirements for accuracy, timeliness, and correct use of procedures.

i. Upgrade Certification Procedures: Prior to upgrade, all 2A4X2 maintenance personnel, regardless of duty position, must satisfactorily complete 2A4X2 upgrade training requirements.

Trainees must also meet AFSC requirements outlined in AFRs 35-1 and 39-1, and be task certified on 5-level and 7-level upgrade core tasks. All 7-level trainees must be certified on both 5-level and 7-level tasks and complete the formal 2A472 AFSC awarding course for upgrade. Due to different aircraft models, selected core tasks on systems which are not on assigned aircraft, and tasks that have no local training capability, may be deferred by workcenter supervisors. Any deferment action will be coordinated with the maintenance training office. Workcenters may add local upgrade core tasks and non-mandatory tasks to the AFJQS. Completion of non-mandatory tasks, pertinent to the unit, will continue to be accomplished as tasks become available for training.

3. Records Documentation: Entries will be as follows:

a. Identification: Enter trainee's identification data, supervisors/ trainers, and certifying official on the AFJQS identification page.

b. Certification: Certify tasks in pencil as follows:

(1) Certify those tasks listed in the STS.

(2) Circle current duty position task numbers. If in upgrade training, these tasks must include core tasks commensurate with upgrade skill level. Erase all other circled tasks not applicable to the current duty position.

(3) As task training starts, enter the training start date in column 4a.

(4) When the trainee and trainer agree to task proficiency, the trainer will initial column 4d and the trainee will initial column 4c. For task certification, a certifier will evaluate the trainee for proficiency. Upon satisfactory task performance, the certifier will enter the completion date in column 4b and initial column 4e.

(5) Selected STS tasks are listed in a Remove/Install format. Training and time constraints can prevent consecutive task training or certification on both removal and installation. In this situation, divide the trainee, trainer or certifier, and completion date columns with a diagonal(/) to accommodate dual entries. The trainer and trainee will enter an "R" for removal or "I" for installation and their initials adjacent to either side of the (/) in their respective columns. If separate certifications are required, divide column 4b and 4e. Enter "R" or "I", initials, and completion date.

c. Decertification: To decertify an individual who is no longer proficient at a required task, erase all entries associated with the task. A statement will be annotated on an AF Form 623A to reflect the reason for decertification.

d. Recertification: Once retraining is started, enter the new training start date. After completing the task to a "go" level, recertify following procedures in paragraph 3b(4).

e. Transcription: When necessary, e.g., the STS is saturated, dirty, mutilated, etc., the supervisor may transcribe data to a new AFJQS. First, identify current duty position tasks. Second, recertify tasks using current dates in the "completion date" block. The trainer's supervisor will initial in the "certifying official" block. The trainee will initial in the "trainee's" block. Tasks previously certified but not required in the current duty position will have only the previous certification date carried forward. Give the old AFJQS to the trainee to retain in their training history.

4. Proficiency Code Keys. Attachment 1, page 2, contains the proficiency code key used to indicate level of training and knowledge provided by resident training and career development courses.

5. Recommendations. Report unsatisfactory performance of individual course graduates, using AF Form 1284 as prescribed in AFR 50-38. Report inadequacies and suggested corrections to this STS through channels to 81 TTG/TTS, 825 Hercules St, Ste 102, Keesler AFB MS 39534-2038, referencing specific paragraphs. A customer service information line has been installed for the supervisor's convenience to identify graduates who may have received insufficient training on task/knowledge items listed in this training standard. For a quick response to problems, call our customer service information line, Defense Switching Network (DSN) 597-4566, anytime day or night.

**BY ORDER OF THE SECRETARY OF THE AIR FORCE**

**OFFICIAL**

**MERRILL A. McPEAK, General, USAF  
Chief of Staff**

**EDWARD A PARDINI, Colonel, USAF  
Director of Information Management**

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**2 Attachments  
1. Qualitative Requirements  
2 Electronic Principles**

<i>-This Block Is For Identification Purposes Only</i>		
Name Of Trainee		
Printed Name ( <i>Last, First, Middle Initial</i> )	Initials (Written)	SSAN
Printed Name Of Certifying Official And Written Initials		
<i>N/I</i>	<i>N/I</i>	
<i>N/I</i>	<i>N/I</i>	
<i>N/I</i>	<i>N/I</i>	
<i>N/I</i>	<i>N/I</i>	
<i>N/I</i>	<i>N/I</i>	
<i>N/I</i>	<i>N/I</i>	
<i>N/I</i>	<i>N/I</i>	
<i>N/I</i>	<i>N/I</i>	

## QUALITATIVE REQUIREMENTS

Proficiency Code Key		
	Scale Value	Definition: The individual
<b>Task Performance Levels</b>	<b>1</b>	Can do simple parts of the task. Needs to be told or shown how to do most of the task. (EXTREMELY LIMITED)
	<b>2</b>	Can do most parts of the task. Needs only help on hardest parts. (PARTIALLY PROFICIENT)
	<b>3</b>	Can do all parts of the task. Needs only a spot check of completed work. (COMPETENT)
	<b>4</b>	Can do the complete task quickly and accurately. Can tell or show others how to do the task. (HIGHLY PROFICIENT)
<b>*Task Knowledge Levels</b>	<b>a</b>	Can name parts, tools, and simple facts about the task. (NOMENCLATURE)
	<b>b</b>	Can determine step by step procedures for doing the task. (PROCEDURES)
	<b>c</b>	Can identify why and when the task must be done and why each step is needed. (OPERATING PRINCIPLES)
	<b>d</b>	Can predict, isolate, and resolve problems about the task. (ADVANCED THEORY)
<b>**Subject Knowledge Levels</b>	<b>A</b>	Can identify basic facts and terms about the subject. (FACTS)
	<b>B</b>	Can identify relationship of basic facts and state general principles about the subject. (PRINCIPLES)
	<b>C</b>	Can analyze facts and principles and draw conclusions about the subject. (ANALYSIS)
	<b>D</b>	Can evaluate conditions and make proper decisions about the subject. (EVALUATION)
<p style="text-align: center;">Explanations</p> <p>* A task knowledge scale value may be used alone or with a task performance scale value to define a level of knowledge for a specific task. (Example: b and 1b)</p> <p>** A subject knowledge scale value is used alone to define a level of knowledge for a subject not directly related to any specific task, or for a subject common to several tasks.</p> <p>- This mark is used alone instead of a scale value to show that no proficiency training is provided in the courses or CDC's.</p> <p>x This mark is used in course columns to show that training is required but not given due to limitations in resources.</p>		

1	2				3		4				
	FORMAL TRAINING				CORE TASK		OJT/CERTIFICATION				
	2a	2b	2c	2d	3a	3b	4a	4b	4c	4d	4e
	3 LVL	CDC	7 LVL	EXPORT-ABLE COURSE	5	7	START	COMP	TRAIN-EE	TRAIN-ER	CERT
	5	7	5	7	5	7					
NOTE 1: Users are responsible for annotating updated training references to identify current references pending STS (PRIVATE) revision.											
NOTE 2: Items in column 1 marked with an asterisk (*) are the task knowledge items that are trained in resident wartime courses.											
NOTE 3: Asterisks in column 3a and 3b indicate minimum mandatory requirements for upgrade to applicable skill level.											
NOTE 4: Where AFI 21-101 technical reference are quoted, applicable MAJCOM/Multicommand regulations apply.											
1. CAREER LADDER PROGRESSION TR: AFI 36-2108											
a. Progression in career ladder 2A4X2	A	-	-								
b. Duties of AFSC 2A4X2/52/72	B	-	-								
*2. SECURITY TR: DOD 5200.1-R/AFR 205-1											
a. Communications Security (COMSEC) TR: AFI 21-109											
(1) Prevent security violations	a	-	-								
(2) Use MAJCOM/Separate Operating Agency (SOA) Essential Elements of Friendly Information (EEFIs)	a	-	-								
(3) Observe security precautions involved in communications	a	-	-								
b. COMPUSEC	A	-	-								
c. Operational Security (OPSEC) TR: AFI 10-1101	A	-	-								
d. Physical Security TR: AFR 205-1											
(1) Safeguard classified equipment	b	-	-								
(2) Safeguard classified information	b	-	-								

1 TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					3 CORE TASK		4 OJT/CERTIFICATION				
	2a	2b	2c	2d	EXPORT- ABLE COURSE	3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
	3 LVL	CDC 5 7	7 LVL	5 7								
*3. AF OCCUPATIONAL SAFETY AND HEALTH (AFOSH) PROGRAM TR: AFOSH Standards 127-1, 127-9, 127-11, 127-31, 127-66, 161-6; AFIs 91-202, 91-302; TOs 00-25-172, 00-25-234, 1-1-300, 1-1-655, 1-1-688, 33-1-141, 161-21  a. Safety precautions associated with the job TR: AFR 127-12  b. Environmental hazards associated with the job TR: AFOSH STD 161-21  4. AF TECHNICAL ORDERS  *a. Use technical orders TR: Applicable aircraft and equipment TOs  (1) Methods and Procedures  (2) Technical Manuals  (3) Abbreviated Tech Orders  (4) Illustrated Parts Breakdown  b. Technical order maintenance TR: TOs 00-5-1, 00-5-2  c. Technical order improvement reports TR: TOs 00-5-1, 00-5-2  5. AF SUPPLY DISCIPLINE TR: AFRs 20-14, 67-23, 177-11 AFMs 66-279, (Vol 27), 67-1 (Vol I, Part 1, Chap I and II); TO 00-20-3 (Sec II)  *a. Property Management	B	-	-									
	B	-	-									
	2b	B	-									
	2b	B	-									
	2b	B	-									
	2b	-	-									
	-	-	-									
	A	-	-									
	A	B	-									



TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION				
	2					3		4				
	2a 3 LVL	2b CDC 5 7	2c 7 LVL	2d EXPORT- ABLE COURSE 5 7		3a 5	3b 7	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
1												
5. AF SUPPLY DISCIPLINE(CONT'D)												
b. Principles of supply												
(1) Authorization	-	B	-									
(2) Management	-	B	-									
(3) DLR/RSD	-	B	-									
c. Prepare TR: AFM 66-279; TO 0020-3 (Sec II)												
(1) Requisitions	-	B	-									
(2) Turn-in slips	-	-	-									
*(3) AFTO Form 350	2b	-	-									
*(4) Condition tags	a	-	-									
6. SUPERVISION OF MAINTENANCE												
a. Schedule work assignments TR: AFR 66-1;	-	-	B									
b. Direct workcenter maintenance activities TR: AFR 66-1	-	-	B	C								
c. Protect workcenter resources TR: AFRs 67-23; AFI 21-101 AFM 67-1 (Vol II, Part I); TO 00-20-1 (Sec II)	-	-	-									
d. Review maintenance documentation TR: AFI 21-101; TOs 00-20 Series, 00-35D-54	-	-	-									
e. Evaluate completed maintenance TR: AFI 21-101	-	-	-									
f. Supervise workcenter safety program TR: AFI 21-101; AFOSH Standards and Occupational Safety Standards	-	-	-									

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	FORMAL TRAINING					CORE TASK	OJT/CERTIFICATION					
		2						3		4			
		2a	2b	2c	2d	EXPORT- ABLE COURSE 57	3a	3b	4a	4b	4c	4d	4e
		3 LVL	CDC 57	7 LVL	57		5	7	START	COMP	TRAIN- EE	TRAIN- ER	CERT
7. TRAINING TR: AFI 36-2202; AFM 50-62													
a. Determine training requirements		-	-	-									
b. Plan training		-	-	-									
c. Supervise training		-	-	-									
d. Conduct training		-	-	-									
e. Evaluate													
(1) Training Effectiveness		-	-	-									
(2) Trainers		-	-	-									
(3) Trainees		-	-	-									
f. Maintain training records		a	-	-									
g. Recommend personnel for training TR: AFIs 36-2101, 36-2108		-	-	-									
8. MAINTENANCE MANAGEMENT TR: AFI 21-101													
a. Basic functions within the maintenance complex		A	-	-									
*b. Maintenance Data Collection System TR: AFM 66-279, TO 00-20 Series		A	B	-									
c. Processing materiel TR: AFI 21-101, 67-23		-	-	-									
d. Controlling materiel TR: AFI 21-101, 67-23		-	-	-									
9. MAINTENANCE AND INSPECTION													
a. Maintenance systems TR: TO 00-20 Series		A	B	-									
b. Inspection systems TR: 00-20 Series		A	B	-									

1 TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION				
	2a	2b	2c	2d	EXPORT- ABLE COURSE	3		4				
	3 LVL	CDC 5 7	7 LVL	5 7		3a 5	3b 7	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
9. MAINTENANCE AND INSPECTION (CONT'D)												
c. Use maintenance forms TR: AFM 66-279; TO 00-20 Series	2b	B	-									
d. Product Improvement Program TR: AFR 66-30; TOs 00-25-195, 00-35D-54												
(1) Deficiency Reporting System	A	-	-									
(2) AFTO Form 135 Actions (SMR code changes)	A	-	-									
(3) Suggestion Program	A	-	-									
10. CORE AUTOMATED MAINTENANCE SYSTEMS (CAMS) TR: AFM 66-279 (Vol 1,2,6 and 9); TO 00-20 Series												
a. Create maintenance actions	2b	-	-									
b. Schedule maintenance actions	2b	-	-									
c. Document maintenance actions	2b	-	-									
d. Perform maintenance and training inquiry reviews	2b	-	-									
e. Standard Base Supply System (SBSS) interface	A	-	-									
11. FUNDAMENTALS OF AVIONIC SYSTEMS MAINTENANCE TR: TOs 00-25-234, 1-1A-14; Applicable Technical Data												
a. Use common hardware TR: TO 1-1A-8	-	-	-									
b. Use lock wiring techniques TR: TOs 1-1A-8, 1-1A-14	2b	-	-									
c. Repair electrical wires TR: TOs 00-25-234, 1-1A-14, 33-1-32	-	-	-									
d. Avionics corrosion control TR: TO 1-1-689	A	-	-									

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION					
		2a	2b		2c	2d	3		4					
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE 5 7	3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT	
			5	7				5	7					
11. FUNDAMENTALS OF AVIONIC SYSTEMS MAINTENANCE (CONT'D)														
e. Use common handtools TR: TOs 32-1-2, 32-1-101		2b	-	-										
f. Perform scheduled aircraft inspections TR: Appropriate aircraft -6		-	-	-										
g. Coaxial cables TR: TOs 00-25-234, 1-1A-14														
(1) Repair		-	-	-				*						
(2) Fabricate		-	-	-				*						
h. Multiconductor cable TR: TOs 00-25-234, 1-1A-14														
(1) Repair		2b/b	-	-										
(2) Fabricate		2b/b	-	-										
*i. Use equipment diagrams TR: Applicable Technical Data		2b	-	-										
j. Consolidated Tool Kits (CTKs) TR: Applicable MAJCOM Directive														
(1) Inventory		1a	-	-										
(2) Maintain		1a	-	-										
k. Use maintenance stands TR: AFOSH STD 127-9, Para 4i; 127-66		b	-	-										
l. Use torque indicating tools TR: TO 32B14-3-1-101, Applicable systems TOs		-	-	-										
m. Use tension indicating tools TR: TOs 33A3 Series, Applicable system TOs		-	-	-										
n. Protect exposed electrical connectors, pressure lines, and waveguides TR: TOs 00-25-234, 1-1A-14, 1-1A-15, 42E1-1-1		b	-	-										

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION					
		2					3		4					
		2a	2b		2c	2d								
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE 5 7		3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
		5	7					5	7					
11. FUNDAMENTALS OF AVIONIC SYSTEMS MAINTENANCE (CONT'D)														
*o. Electrostatic Discharge Sensitive Devices (ESDS) TR: TOs 00-25-234, Applicable Equipment TOs														
(1) Identify ESDS components		-	-	-										
(2) Use proper ESDS handling procedures		-	-	-										
p. Repair electrical connections														
(1) Crimp connections		-	-	-										
(2) Solder connections		-	-	-										
(3) Modular blocks		-	-	-										
(4) Pot electrical connections		-	-	-										
q. Use Powered Aerospace Ground Equipment (AGE)														
(1) Power Carts		-	-	-										
(2) Heaters		-	-	-										
(3) Air Conditioners		-	-	-										
(4) Light Carts		-	-	-										
(5) Air Compressors		-	-	-										
12. TEST EQUIPMENT TR: Applicable Technical Data														
a. Principles of application		-	-	-										
*b. Use test equipment														
(1) Power meter		2b	-	-										
(2) Data Bus Analyzer		-	-	-										

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2					CORE TASK		OJT/CERTIFICATION				
		2a	2b		2c	2d	3		4				
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE 5 7	3a 5	3b 7	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
12. TEST EQUIPMENT (CONT'D)													
c. Inspect		-	-	-									
d. Isolate faults		-	-	-									
e. Repair		-	-	-									
f. Calibrate		-	-	-									
g. Modify		-	-	-									
13. ON EQUIPMENT MAINTENANCE PROCEDURES													
a. Use safety procedures		b	B	-									
b. Foreign object damage (FOD) program TR: AFI 21-101		A	-	-									
c. Apply aircraft power		-	-	-									
14. COMMUNICATION SYSTEMS													
a. Interphone													
(1) Purpose and characteristics		B	B	-									
(2) Theory of operation		B	B	-									
(3) Perform operational check		2b	-	-			*						
(4) Basic Troubleshooting		2b	-	-				*					
(5) Remove system LRUs		2b	-	-									
(6) Install system LRUs		2b	-	-			*						
(7) Advanced troubleshooting		-	-	B	3c/c								
*b. Ultra High Frequency (UHF) Radio													
(1) Purpose and characteristics		B	B	-									
(2) Theory of operation		B	B	-									
(3) Perform operational check		2b	-	-			*						

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION				
		2a	2b		2c	2d	3		4				
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE 5 7	3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
		5	7		5	7	5	7					
14. COMMUNICATION SYSTEMS (CONT'D)													
.....													
(4) Basic Troubleshooting		2b	-	-				*					
(5) Remove system LRUs		2b	-	-			*						
(6) Install system LRUs		2b	-	-			*						
(7) Advanced troubleshooting		-	-	-									
*c. High Frequency (HF) Radio													
(1) Purpose and characteristics		B	B	-									
(2) Theory of operation		B	B	-									
(3) Perform operational check		2b	-	-			*						
(4) Basic Troubleshooting		2b/b	-	-				*					
(5) Remove system LRUs		-	-	-			*						
(6) Install system LRUs		-	-	-			*						
(7) Install, remove & inspect antennas		-	-	-				*					
(8) Advanced troubleshooting		-	-	-				*					
*d. Very High Frequency (VHF) AM/FM Radio													
(1) Purpose and characteristics		B	B	-									
(2) Theory of operation		B	B	-									
(3) Perform operational check		-	-	-			*						
(4) Basic Troubleshooting		-	-	-				*					
(5) Remove system LRUs		-	-	-			*						
(6) Install system LRUs		-	-	-			*						
(7) Advanced troubleshooting		-	-	-									
e. Very Low Frequency (VLF)/Low Frequency (LF) Radio													
(1) Purpose and characteristics		-	-	-									

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2					CORE TASK		OJT/CERTIFICATION				
		FORMAL TRAINING											
		2a	2b		2c	2d	3		4				
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE 57	3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
		5	7				5	7					
14. COMMUNICATION SYSTEMS (CONTINUED)													
(2) Theory of operation		-	-	-									
(3) Perform operational check		-	-	-									
(4) Basic Troubleshooting		-	-	-									
(5) Remove system LRUs		-	-	-									
(6) Install system LRUs		-	-	-									
(7) Advanced troubleshooting		-	-	-									
*f. Secure Voice													
(1) Purpose and characteristics		B	B	-									
(2) Theory of operation		B	B	-									
(3) Perform operational check		-	-	-			*						
(4) Basic Troubleshooting		-	-	-				*					
(5) Remove system LRUs		-	-	-			*						
(6) Install system LRUs		-	-	-			*						
(7) Advanced troubleshooting		-	-	-									
g. Cockpit Voice Recorder													
(1) Purpose and characteristics		-	-	-									
(2) Theory of operation		-	-	-									
(3) Perform operational check		-	-	-									
(4) Basic Troubleshooting		-	-	-									
(5) Remove system LRUs		-	-	-									
(6) Install system LRUs		-	-	-									
(7) Advanced troubleshooting		-	-	-									
h. Emergency Locator Transmitters (ELT)													
(1) Purpose and characteristics		-	B	-									



1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2					CORE TASK		OJT/CERTIFICATION				
		2a	2b		2c	2d	3		4				
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE 57	3a 5	3b 7	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
			5	7									
14. COMMUNICATION SYSTEMS (CONTINUED)													
(2) Theory of operation		-	B	-									
(3) Perform operational check		-	-	-									
(4) Basic Troubleshooting		-	-	-									
(5) Remove system LRUs		-	-	-									
(6) Install system LRUs		-	-	-									
(7) Advanced troubleshooting		-	-	-									
*i. Public Address													
(1) Purpose and characteristics		A	B	-									
(2) Theory of operation		-	B	-									
(3) Perform operational check		-	-	-									
(4) Basic Troubleshooting		-	-	-									
(5) Remove system LRUs		-	-	-									
(6) Install system LRUs		-	-	-									
(7) Advanced troubleshooting		-	-	-									
j. Air Force Satellite Communication (AFSATCOM)													
(1) Purpose and characteristics		-	B	-									
(2) Theory of operation		-	B	-									
(3) Perform operational check		-	-	-									
(4) Basic Troubleshooting		-	-	-									
(5) Remove system LRUs		-	-	-									
(6) Install system LRUs		-	-	-									
(7) Advanced troubleshooting		-	-	-									

[illegible]

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION				
		2a	2b		2c	2d EXPORT- ABLE COURSE 57	3		4				
		3 LVL	CDC 57		7 LVL		3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
15. NAVIGATION PRINCIPLES TR: Applicable Technical Data													
*a. Identification Friend or Foe (IFF) Transponders													
(1) Purpose and characteristics		B	B	-									
(2) Theory of operation		B	B	-									
(3) Perform operational check		2b	-	-			*						
(4) Basic Troubleshooting		-	-	-				*					
(5) Remove system LRUs		-	-	-			*						
(6) Install system LRUs		-	-	-			*						
(7) Advanced troubleshooting		-	-	B	3c/c								
b. IFF Interrogators													
(1) Purpose and characteristics		-	-	-									
(2) Theory of operation		-	-	-									
(3) Perform operational check		-	-	-									
(4) Basic Troubleshooting		-	-	-									
(5) Remove system LRUs		-	-	-									
(6) Install system LRUs		-	-	-									
(7) Advanced troubleshooting		-	-	-									
c. IFF Mode IV Computers													
(1) Purpose and characteristics		-	-	-									
(2) Theory of operation		-	-	-									
(3) Perform operational check		-	-	-			*						
(4) Basic Troubleshooting		-	-	-				*					
(5) Remove system LRUs		-	-	-			*						
(6) Install system LRUs		-	-	-			*						
(7) Advanced troubleshooting		-	-	-									

1 TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION				
	2a	2b	2c	2d	EXPORT- ABLE COURSE	3		4				
	3 LVL	CDC 5 7	7 LVL	5 7		3a 5	3b 7	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
15. NAVIGATION SYSTEMS (CONTINUED)												
*d. Radar Altimeters												
(1) Purpose and characteristics	B	B	-									
(2) Theory of operation	B	B	-									
(3) Perform operational check	2b	-	-									
(4) Basic Troubleshooting	-	-	-									
(5) Remove system LRUs	-	-	-									
(6) Install system LRUs	-	-	-									
(7) Advanced troubleshooting	-	-	-									
*e. Tactical Air Navigation (TACAN)												
(1) Purpose and characteristics	B	B	-									
(2) Theory of operation	B	B	-									
(3) Perform operational check	2b	-	-			*						
(4) Basic Troubleshooting	2b/b	-	-				*					
(5) Remove system LRUs	2b	-	-			*						
(6) Install system LRUs	2b	-	-			*						
(7) Advanced troubleshooting	-	-	-									
*f. VHF Omni Range (VOR)/Instrument Landing System (ILS)												
(1) Purpose and characteristics	B	B	-									
(2) Theory of operation	B	B	-									
(3) Perform operational check	2b	-	-			*						
(4) Basic Troubleshooting	2b	-	-				*					
(5) Remove system LRUs	2b	-	-			*						
(6) Install system LRUs	2b	-	-			*						
(7) Advanced troubleshooting	-	-	-									

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION				
		2a	2b		2c	2d	3		4				
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE	3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
			5	7		5 7	5	7					
15. NAVIGATION SYSTEMS (CONTINUED)													
g. Automatic Direction Finder (ADF)													
(1) Purpose and characteristics													
(2) Theory of operation													
(3) Perform operational check													
(4) Basic Troubleshooting													
(5) Remove system LRUs													
(6) Install system LRUs													
(7) Advanced troubleshooting													
h. Global Positioning System (GPS)													
(1) Purpose and characteristics													
(2) Theory of operation													
(3) Perform operational check													
(4) Basic Troubleshooting													
(5) Remove system LRUs													
(6) Install system LRUs													
(7) Advanced troubleshooting													
i. Radar Beacon													
(1) Purpose and characteristics													
(2) Theory of operation													
(3) Perform operational check													
(4) Basic Troubleshooting													
(5) Remove system LRUs													
(6) Install system LRUs													
(7) Advanced troubleshooting													

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION				
		2a	2b		2c	2d	3		4				
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE	3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
			5	7		5	5	7					
15. NAVIGATION SYSTEMS (CONTINUED)													
j. Search and Weather Radar													
(1) Purpose and characteristics													
(2) Theory of operation													
(3) Perform operational check													
(4) Basic Troubleshooting													
(5) Remove system LRUs													
(6) Install system LRUs													
(7) Advanced troubleshooting													
k. Color Weather Radar													
(1) Purpose and characteristics													
(2) Theory of operation													
(3) Perform operational check													
(4) Basic Troubleshooting													
(5) Remove system LRUs													
(6) Install system LRUs													
(7) Advanced troubleshooting													
l. Terrain/Multimode Radar													
(1) Purpose and characteristics													
(2) Theory of operation													
(3) Perform operational check													
(4) Basic Troubleshooting													
(5) Remove system LRUs													
(6) Install system LRUs													
(7) Advanced troubleshooting													

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	FORMAL TRAINING						CORE TASK		OJT/CERTIFICATION				
		2						3		4				
		2a	2b		2c	2d								
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE 5 7		3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
		5	7					5	7					
15. NAVIGATION SYSTEMS (CONTINUED)														
m. Acquisition Radar														
(1) Purpose and characteristics		-	B	-										
(2) Theory of operation		-	B	-										
(3) Perform operational check		-	-	-										
(4) Basic Troubleshooting		-	-	-										
(5) Remove system LRUs		-	-	-										
(6) Install system LRUs		-	-	-										
(7) Advanced troubleshooting		-	-	-										
n. Station Keeping Equipment (SKE)														
(1) Purpose and characteristics		-	B	-										
(2) Theory of operation		-	B	-										
(3) Perform operational check		-	-	-										
(4) Basic Troubleshooting		-	-	-										
(5) Remove system LRUs		-	-	-										
(6) Install system LRUs		-	-	-										
(7) Advanced troubleshooting		-	-	-										
o. Doppler														
(1) Purpose and characteristics		B	B	-										
(2) Theory of operation		B	B	-										
(3) Perform operational check		-	-	-										
(4) Basic Troubleshooting		-	-	-										
(5) Remove system LRUs		-	-	-										
(6) Install system LRUs		-	-	-										
(7) Advanced troubleshooting		-	-	-										

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION				
		2a	2b		2c	2d EXPORT- ABLE COURSE 5 7	3		4				
		3 LVL	CDC 5 7		7 LVL		3a 5	3b 7	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
15. NAVIGATION SYSTEMS (CONTINUED)													
p. Self-Contained Navigation System (SCNS)													
(1) Purpose and characteristics		-	-	-									
(2) Theory of operation		-	-	-									
(3) Perform operational check		-	-	-									
(4) Basic Troubleshooting		-	-	-									
(5) Remove system LRUs		-	-	-									
(6) Install system LRUs		-	-	-									
(7) Advanced troubleshooting		-	-	-									
q. Computing Optical Sighting System (COSS)													
(1) Purpose and characteristics		-	B	-									
(2) Theory of operation		-	B	-									
(3) Perform operational check		-	-	-									
(4) Basic Troubleshooting		-	-	-									
(5) Remove system LRUs		-	-	-									
(6) Install system LRUs		-	-	-									
(7) Advanced troubleshooting		-	-	-									



1 TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION				
	2a	2b	2c	2d	EXPORT- ABLE COURSE	3		4				
	3 LVL	CDC	7 LVL	5 7		3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
1	5	7	5	7	5	7	5	7	5	7	5	7
<p>NOTE 1: This attachment identifies the Air Force standardized electronic fundamentals and application of entries.</p> <p>NOTE 2: Items identified with a "-" will not be taught in the CETP; items in parenthesis () are taught or closed out in the sets portion of the course.</p> <p>NOTE 3: Only training items coded in column 2a will be taught in the CETP during wartime.</p> <p>NOTE 4: Item 27 has been omitted from Attachment 2 and is incorporated into item 11 of Attachment 1.</p> <p>1. BASIC TERMS TR: TOs 31-1-141-2, 31-1-141-5</p> <p>a. Metric notation</p> <p>b. DC terms</p> <p>c. AC terms</p> <p>2. BASIC CIRCUITS TR: TOs 31-1-141-2, 31-1-141-9</p> <p>a. Theory of operation</p> <p>b. Troubleshoot circuits</p> <p>3. BASIC CIRCUIT CALCULATIONS TR: TO 31-1-141-5</p> <p>a. DC</p> <p>b. AC</p> <p>4. RESISTORS TR: TOs 31-1-141-2, 31-1-141-15</p> <p>a. Theory of operation</p> <p>b. Isolate faulty resistors</p> <p>c. Color code</p> <p>5. RELAYS AND SOLENOIDS TR: TOs 31-1-141-2, 31-1-141-3</p> <p>a. Relay theory of operation</p> <p>b. Isolate faulty relays</p> <p>c. Solenoid theory of operation</p> <p>d. Isolate faulty solenoids</p>												
	B	-	-									
	B	-	-									
	B	-	-									
	B	B	-									
	2b	-	-									
	B	-	-									
	B	-	-									
	B	-	-									
	2b	-	-									
	B	B	-									
	B	B	-									
	2b	B	-									
	-	-	-									
	-	-	-									

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION				
		2a	2b		2c	2d	3		4				
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE 5      7	3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
			5	7									
6. INDUCTORS TR: TOs 31-1-141-2, 31-1-141-15													
a. Theory of operation		B	B	-									
b. Isolate faulty inductors		2b	-	-									
c. Calculations		B	B	-									
7. CAPACITORS TR: TOs 31-1-141-2, 31-1-141-5, 31-1-141-15													
a. Theory of operation		B	B	-									
b. Isolate faulty capacitors		2b	-	-									
c. Calculations		B	B	-									
d. Color code		-	-	-									
8. TRANSFORMERS TR: TOs 31-1-141-2, 31-1-141-5, 31-1-141-15													
a. Theory of operation		B	B	-									
b. Isolate faulty transformers		-	-	-									
c. Calculations		-	-	-									
9. THREE PHASE TRANSFORMERS TR: TOs 31-1-141-2, 31-1-141-15													
a. Theory of operation		B	B	-									
b. Isolate faulty three phase transformers		-	-	-									
10. DC MOTORS TR: TOs 31-1-141-2, 31-1-141-9													
a. Theory of operation		(B)	-										
b. Troubleshoot DC motors		-	-	-									
11. AC MOTORS TR: TOs 31-1-141-2, 31-1-141-9													
a. Theory of operation		(B)	B	-									
b. Troubleshoot AC motors		-	-	-									

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					3 CORE TASK		4 OJT/CERTIFICATION				
		2a	2b		2c	2d	3a	3b	4a	4b	4c	4d	4e
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE 5 7							
			5	7			5	7	START	COMP	TRAIN- EE	TRAIN- ER	CERT
12. DC GENERATORS TR: TOs 31-1-141-2, 31-1-141-9, 31-1-141-13													
a. Theory of operation		-	B	-									
b. Troubleshoot DC generators		-	-	-									
13. AC GENERATORS TR: TOs 31-1-141-2, 31-1-141-9, 31-1-141-13													
a. Theory of operation		-	B	-									
b. Troubleshoot AC generators		-	-	-									
14. ALTERNATORS TR: TOs 31-1-141-2, 31-1-141-9													
a. Theory of operation		-	-	-									
b. Troubleshoot alternators		-	-	-									
15. SYNCHRO/SERVOS TR: TOs 31-1-141-2, 31-1-141-9													
a. Theory of operation		(B)	B	-									
b. Troubleshoot synchro/servos		-	-	-									
16. CHOPPERS (SYNCHRONOUS VIBRATORS) TR: TO 31-1-141-2													
a. Theory of operation		-	B	-									
b. Isolate faulty choppers		-	-	-									
17. TRANSDUCERS TR: TOs 31-1-141-3, 31-1-141-13													
a. Theory of operation		-	-	-									
b. Isolate faulty transducers		-	-	-									
18. METER MOVEMENTS TR: TOs 31-1-141-2, 31-1-141-7, 31-1-141-14c													
a. Theory of operation		-	-	-									
b. Isolate faulty meter movements		-	-	-									

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2					CORE TASK	OJT/CERTIFICATION						
		2a	2b		2c	2d EXPORT- ABLE COURSE 57		3		4				
		3 LVL	CDC		7 LVL			3a	3b	4a	4b	4c	4d	4e
			5	7				5	7	START	COMP	TRAIN- EE	TRAIN- ER	CERT
19. SOLID STATE DIODES TR: TOs 31-1-141-4, 31-1-141-15														
a. Theory of operation		B	B	-										
b. Isolate faulty solid state diodes		2b	-	-										
c. Specifications		-	-	-										
d. Color code		-	-	-										
20. BIPOLAR JUNCTION TRANSISTORS TR: TO 31-1-141-4														
a. Theory of operation		B	B	-										
b. Isolate faulty transistors		2b	-	-										
c. Specifications		-	-	-										
21. INTEGRATED CIRCUITS TR: TO 31-1-141-4														
a. Familiarization		B	B	-										
b. Isolate faulty integrated circuits		-	-	-										
c. Specifications		-	-	-										
22. SOLID STATE SPECIAL PURPOSE DEVICES TR: TO 31-1-141-4														
a. Theory of operation														
(1) SCR		B	B	-										
(2) Zener diode		B	B	-										
(3) Tunnel diode		B	B	-										
(4) LED		B	-	-										
(5) LCD		B	-	-										
(6) UJT		B	B	-										
(7) JFET		B	B	-										
(8) MOSFET		B	B	-										
b. Isolate faulty special purpose devices		2b	-	-										

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2					CORE TASK		OJT/CERTIFICATION				
		2a	2b		2c	2d	3		4				
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE 5 7	3a 5	3b 7	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
			5	7									
23. ELECTRON TUBES TR: TOs 31-1-141-1, 31-1-141-3, 31-1-141-9													
a. Theory of operation		B	-	-									
b. Isolate faulty electron tubes		-	-	-									
c. Specifications		-	-	-									
24. CATHODE RAY TUBES TR: TOs 31-1-141-1, 31-1-141-3													
a. Theory of operation		B	-	-									
b. Isolate faulty cathode ray tube		-	-	-									
25. SOLDER AND DESOLDER TR: TOs 00-25-234, 1-1A-14, 31-1-141-15													
a. Terminal connections		2b	-	-									
b. PC Boards		2b	-	-									
c. Multipin connectors		2b	-	-									
d. Coaxial connectors		2b	-	-									
26. ASSEMBLE SOLDERLESS CONNECTORS TR: TOs 1-1A-14 and 31-1-141-15													
a. Crimp connections		2b	-	-									
b. Coaxial connectors		2b	-	-									
c. Multipin connectors		2b	-	-									
28. TRANSISTOR AMPLIFIER CIRCUITS TR: TOs 31-1-141-1, 31-1-141-4													
a. Theory of operation													
(1) Amplifier circuits		B	B	-									
(2) Stabilization circuits		B	B	-									
(3) Coupling circuits		B	B	-									
b. Troubleshoot circuits		2b	-	-									

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2					3		4				
		FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION				
		2a	2b		2c	2d	3a	3b	4a	4b	4c	4d	4e
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE							
		5	7		5	7	5	7					
29. ELECTRON TUBE AMPLIFIERS TR: TO 31-1-141-3													
a. Theory of operation													
b. Troubleshoot circuits													
30. OPERATIONAL AMPLIFIERS TR: TO 31-1-141-3													
a. Theory of operation													
b. Isolate faulty operational amplifiers													
31. MAGNETIC AMPLIFIERS TR: TO 31-1-141-4													
a. Theory of operation													
b. Troubleshoot circuits													
32. SATURABLE REACTORS TR: TO 31-1-141-4													
a. Theory of operation													
b. Troubleshoot saturable reactor circuits													
33. POWER SUPPLY CIRCUITS TR: TOs 31-1-141-3, 31-1-141-4, 31-1-141-9, 31-1-141-15													
a. Theory of operation													
(1) Rectifiers													
(2) Filters													
b. Troubleshoot circuits													
34. VOLTAGE REGULATORS TR: TOs 31-1-141-3, 31-1-141-4													
a. Theory of operation													
b. Troubleshoot circuits													

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2					CORE TASK		OJT/CERTIFICATION				
		2a	2b		2c	2d	3		4				
		3 LVL	CDC	7 LVL	EXPORT- ABLE COURSE 57	3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT	
35. RESISTIVE-CAPACITIVE-INDUCTIVE (RCL) CIRCUITS to: TOs 31-1-141-2, 31-1-141-5													
a. Basic operation													
b. Resonant operation													
c. Troubleshoot circuits													
d. Calculations													
36. FREQUENCY SENSITIVE FILTERS TR: TO 31-1-141-2													
a. Theory of operation													
b. Troubleshoot circuits													
c. Calculations													
37. WAVE GENERATING CIRCUITS TR: TOs 31-1-141-3, 31-1-141-4, 31-1-141-10													
a. Theory of operation													
(1) Oscillators													
(2) Multivibrators													
(3) Waveshaping circuits													
b. Troubleshoot circuits													
38. LIMITER CIRCUITS TR: TO 31-1-141-4													
a. Theory of operation													
(1) Diode													
(2) Zener diode													
(3) Transistor													
b. Troubleshoot circuits													

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION				
		2		2c  7 LVL	2d EXPORT- ABLE COURSE 5      7	3		4					
		2a  3 LVL	2b  CDC  5      7			3a  5	3b  7	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT	
39. CLAMPER CIRCUITS TR: TO 31-1-141-4													
a. Theory of operation		B	B	-									
b. Troubleshoot circuits		-	-	-									
40. DIGITAL NUMBERING SYSTEMS TR: TO 31-1-141-5													
a. Conversions													
(1) Binary		B	B	-									
(2) Octal		B	B	-									
(3) Hexadecimal		B	B	-									
b. Math operations													
(1) Binary		B	B	-									
(2) Octal		B	B	-									
(3) Hexadecimal		B	B	-									
c. Binary code systems		B	-	-									
41. DIGITAL LOGIC FUNCTIONS TR: TOs 31-1-141-4, 31-1-141-5													
a. Theory of operation													
(1) Main logic gates		B	B	-									
(2) Flip-flops		B	B	-									
b. Troubleshoot circuits		2b	-	-									
c. Logic families		B	-	-									
42. BOOLEAN EQUATIONS TR: TO 31-1-141-5													
a. Diagram to equation		B	-	-									
b. Equation to diagram		B	-	-									
c. Simplify expressions		-	-	-									



1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2					CORE TASK		OJT/CERTIFICATION				
		2a	2b		2c	2d	3		4				
		3	CDC		7	EXPORT- ABLE COURSE	3a	3b	4a	4b	4c	4d	4e
		LVL	5	7	LVL	5	7	5	7	START	COMP	TRAIN- EE	TRAIN- ER
43. COMPUTERS TR: TOs 31-1-141-6c, 31-1-141-9													
a. Operation principles		-	-	-									
b. Load programs		-	-	-									
c. Write and debug programs		-	-	-									
d. Isolate faulty major computer units		-	-	-									
e. Troubleshoot computer subassemblies or circuits		-	-	-									
f. Types of memories		-	-	-									
g. Peripheral devices		-	-	-									
h. Programming languages		-	-	-									
44. MICROPROCESSOR CONTROLLED SYSTEMS TR: TO 31-1-141-6c													
a. Theory of operation		-	-	-									
b. Isolate faulty microprocessors		-	-	-									
45. LOGIC CIRCUITS TR: TOs 31-1-141-5, 31-1-141-13													
a. Theory of operation													
(1) Counters		B	B	-									
(2) Registers		B	B	-									
(3) Combinational logic circuits		B	-	-									
b. Troubleshoot circuits		2b	-	-									

1 TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					3 CORE TASK		4 OJT/CERTIFICATION				
	2a	2b	2c	2d	EXPORT- ABLE COURSE	3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
	3 LVL	CDC 5 7	7 LVL	5 7								
46. DIGITAL TO ANALOG AND ANALOG TO DIGITAL CONVERTERS TR: TO 31-1-141-13												
a. Theory of operation												
(1) Weighted Resistor digital to analog	B	B	-									
(2) Approximation analog to digital	B	-	-									
(3) Ramp analog to digital	B	-	-									
b. Isolate faulty converters	-	-	-									
47. TRANSMISSION LINES TR: TOs 31-1-141-7, 31-1-141-8, 31-1-141-9, 31-1-141-13												
a. Theory of operation	B	B	-									
b. Perform measurement	-	-	-									
c. Calculations	-	-	-									
d. Isolate faulty transmission lines	-	-	-									
48. WAVEGUIDES TR: TOs 31-1-141-9, 31-1-141-11												
a. Theory of operation	B	B	-									
b. Isolate faulty waveguides	-	-	-									
49. MICROWAVE OSCILLATORS AND AMPLIFIERS TR: TOs 31-1-141-3, 31-1-141-10, 31-1-141-11												
a. Theory of operation	B	-	-									
b. Tune or adjust	-	-	-									
c. Isolate faulty microwave oscillators or amplifiers	-	-	-									

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	FORMAL TRAINING					CORE TASK	OJT/CERTIFICATION					
		2						3		4			
		2a	2b	2c	2d	EXPORT- ABLE COURSE	3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT
		3 LVL	CDC		7 LVL								
5	7				5	7							
50. RESONANT CAVITIES TR: TOs 31-1-141-3, 31-1-141-9, 31-1-141-11													
a. Theory of operation	B	-	-										
b. Isolate faulty resonant cavities	-	-	-										
c. Tune and adjust	-	-	-										
51. TRANSMITTERS TR: TOs 31-1-141-4, 31-1-141-9, 31-1-141-13													
a. Theory of operation													
(1) Amplitude modulation	B	-	-										
(2) Frequency modulation	B	-	-										
(3) Single side band	B	-	-										
(4) Pulse modulation	B	-	-										
b. Troubleshoot circuits	-	-	-										
52. RECEIVERS TR: TOs 31-1-141-4, 31-1-141-9, 31-1-141-13													
a. Theory of operation													
(1) Amplitude modulation	B	-	-										
(2) Frequency modulation	B	-	-										
(3) Single side band	B	-	-										
(4) Pulse modulation	B	-	-										
b. Troubleshoot circuits	-	-	-										
53. TRANSMISSION POWER TR: TOs 31-1-141-7, 31-1-141-8, 31-1-141-11													
a. Perform measurements	2b	-	-										
b. Perform Calculations	(2b)	-	-										

1	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	2 FORMAL TRAINING					CORE TASK		OJT/CERTIFICATION					
		2a	2b		2c	2d	3		4					
		3 LVL	CDC		7 LVL	EXPORT- ABLE COURSE 57	3a	3b	4a START	4b COMP	4c TRAIN- EE	4d TRAIN- ER	4e CERT	
			5	7				5	7					
54. ANTENNAS TR: TO 31-1-141-12														
a. Theory of operation		B	-	-										
b. Perform alignment		-	-	-										
c. Isolate faulty antennas		-	-	-										
55. MICROPHONES TR: TO 31-1-141-3														
a. Theory of operation		(A)	-	-										
b. Troubleshoot circuits		-	-	-										
56. SPEAKERS TR: TO 31-1-141-3														
a. Theory of operation		(A)	-	-										
b. Troubleshoot circuits		-	-	-										
57. PHOTOSENSITIVE DEVICES TR: TOs 31-1-141-3, 31-1-141-4														
a. Theory of operation		B	-	-										
b. Isolate faulty photosensitive devices		-	-	-										
58. DISPLAY TUBES TR: TO 31-1-141-3														
a. Theory of operation		-	-	-										
b. Isolate faulty display tubes		-	-	-										
59. SUPPORT SUBJECTS TR: TOs 31-1-141-1 and 00-25-234														
a. Safety applicable to electronics		B	-	-										
b. First aid for electrical shock		B	-	-										
c. Electrostatic Discharge (ESD)		B	B	-										

**CAREER FIELD EDUCATION AND TRAINING PLAN**  
**PART II SECTION B**  
**SECTION B - AIR FORCE JOB QUALIFICATION**  
**STANDARD (AFJQS) INDEX**

<b><u>AFJQS</u></b>	<b><u>AIRCRAFT</u></b>	<b><u>OPR</u></b>
2A4X2-101	C-5	AMC
2A4X2-102	C-141	AMC
2A4X2-103	C-130	AMC
2A4X2-104	C-135	AMC
2A4X2-105	KC-10	AMC
2A1X3B-002	B-52	ACC
2A1X3B-006	U-2/TR-1	ACC
2A1X3C-001A10	A-10	ACC
2A1X3C-001F4	F-4	ACC

## CAREER FIELD EDUCATION AND TRAINING PLAN PART II, SECTION C - TRAINING COURSE INDEX

Below is a list of favorable courses for broadening and expanding career field knowledge.

<b><u>BASIC COURSES</u></b>		
<b><u>COURSE NUMBER</u></b>	<b><u>TITLE</u></b>	<b><u>OPR</u></b>
E3ABR30020 010	Electronic Principles (CETP)	Keesler 338 TCHTS/TTOT
E3ABR2A432 000	Aircraft Communications/ Navigations Systems Apprentice	Keesler 332 TCHTS/TTOT
E3AAR2A472 000	Aircraft Communication/Navigation Systems Craftsman	Keesler 336 TCHTS/TTOT

### **SUPPLEMENTAL TRAINING COURSES**

E3AZR2A452-000	Autuomatic Communications System (ACS) Maintenance	Keesler 332 TCHTS/TTOT
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### **CURRENT FTD COURSES**

<b><u>COURSE NUMBER</u></b>	<b><u>TITLE</u></b>	<b><u>OPR</u></b>
J4AMF/ASF/AST		
00066 038	Air Force Technical Order System (General)	325 FTD
00066 039	Air Force Technical Order System (Advanced)	325 FTD
00066 058	Air Force Maintenance Data Collection System (CAMS)	512 FTD
00066 059	Air Force Maintenance Data Collection System (CAMS)(781 Auto Forms)	320 FTD
00066 061	Core Automated Maintenance System (CAMS) Operators Course	320 FTD
00066 062	Core Automated Maintenance System (Mid-level Maintenance Managers)	906 FTD
00066 063	Core Automated Maintenance System (Senior-level Maintenance Managers)	320 FTD
30000 022	Basic Soldering Techniques	306 FTD

<b><u>COURSE NUMBER</u></b>	<b><u>TITLE</u></b>	<b><u>OPR</u></b>
30000 023	Microelectronics Soldering Procedures	306 FTD
30050 009	Introduction to Advanced Digital Techniques	524 FTD
30050 010	Advanced Digital Techniques	524 FTD
2A4X2 000	COMM/NAV Maintenance Technician (E/K/R/WC-135) (Organizational Troubleshooting)	514 FTD
2A4X2 001	RC-135 AN/ASC-19(V) AFSATCOM Organizational Maintenance	427 FTD
2A4X2 002	KC-10 Comm and Nav Sys (Communication Organizational Maint)	312 FTD
2A4X2 003	KC-10 Comm and Nav Sys (Navigation Organizational Maint)	312 FTD
2A4X2 004	C-130 Self Contained Navigation System (SCNS) Technician	310 FTD
2A4X2 005	AN/APQ-158 TF/TA Radar	
2A4X2 006	E-3 Communication System Technician	413 FTD
2A4X2 007	E-3 Avionics Nav Aids Specialist Flight Avionic Systems	413 FTD
2A4X2 008	C-5 Avionics Communication Technician (Organizational Maintenance)	524 FTD
2A4X2 009	MC-130H Communication and Navigation Systems Technician (Organizational Maintenance)	327 FTD
2A4X2 010	C-5 Avionics Navigation Technician (Organizational Maintenance)	219 FTD
2A4X2 012	A-10A Communication System Specialist	512 FTD
2A4X2 013	A-10A Navigation System Specialist (Entry Level)	512 FTD
2A4X2 014	AN/APX-101 Avionics Navigation System Technician	512 FTD

2A4X2 016	ABCCC Capsule Maintenance Technician	325 FTD
2A4X2 017	B-52G Global Positioning System Maintenance Technician (Organizational Maintenance)	514 FTD
2A4X2 018	AN/ARC-164 (RT-1288/URC-100) Satellite Communication Technician (Organizational Maintenance)	327 FTD
2A4X2 019	F/RF-4 Avionics Communication Technician	523 FTD
2A4X2 020	F-4 Avionics Navigation Technician (AN/APX-76)	523 FTD
2A1X3 000	COMM/NAV System Technician (AN/APN-218 Intermediate Maintenance)	211 FTD
2A1X3 001	COMM/NAV System Technician (AN/APN-69 Intermediate Maintenance)	514 FTD
2A1X3 002	COMM/NAV System Technician (AN/ARC-190 Intermediate Maintenance)	514 FTD
2A1X3 003	COMM/NAV System Technician (AN/APX-64 Intermediate Maintenance)	514 FTD
2A1X3 007	AN/ARC-186 VHF Communication System Technician (Intermediate Maintenance)	317 FTW
2A1X3 009	AN/ARC-164 "Have Quick" UHF Communication Technician (Intermediate Maintenance)	310 FTW
2A1X3 010	AN/APS-133 Weather Radar (Intermediate Maintenance)	219 FTD
2A1X3 011	AN/APN-59 Radar System Technician (Intermediate Maintenance)	310 FTD
2A1X3 012	AN/APN-169C Station Keeping Equipment (Intermediate Maintenance)	502 FTD



**COURSE NUMBER . TITLE**

2A1X3 013	AN/APX-72 IFF System Technician (Intermediate Maintenance)	310 FTD
2A1X3 015	AN/ARN-118(V) TACAN System Technician (Intermediate Maintenance)	512 FTD
2A1X3 016	SST-181 Beacon Avionics Navigation Systems Technician	325 FTD
2A1X3 017	KY-879 Digital Message Device Group	
2A1X3 018	AN/APX-100 Avionics Navigation System Technician	219 FTD
2A1X3 019	AN/ARN-127 VHF Omni-Range/Instrument Landing System (Intermediate Maintenance)	405 FTD
2A1X3 020	AN/ARN-127 VHF Omni-Range/Instrument Landing System (Organizational Maintenance)	405 FTD
2A1X3 022	KC-135 860F-1 Radio Altimeter Communication and Navigation System Technician (Intermediate Maintenance)	514 FTD
2A1X3 024	AN/APN-171(V) Radar Altimeter (Intermediate Maintenance)	327 FTD
2A1X3 025	AN/APQ-158 TF/TA Radar (Intermediate Maintenance)	531 FTD
2A1X3 026	C-5 Avionics Communication Technician (Intercom and Public Address System)	524 FTD
2A1X3 027	AN/APQ-122(V) Terrain Following Radar (Intermediate Maintenance)	327 FTD
2A1X3 028	AN/APQ-150A Beacon Tracking Radar Technician (Intermediate Maintenance)	327 FTD
2A1X3 031	AN/APQ-122(V)1 AWADS Radar System Technician	215 FTD
2A1X3 033	AN/ARC-164 (URC0108A) Satellite Communication System Technician (Intermediate Maintenance)	327 FTD
2A1X3 040	AN/ARN-147(V) Variable Omni-range/ Instrument Landing System	310 FTD

2A1X3 041	C-17A Communication and Navigation Systems Technician (Basic)	317 FTD
2A1X3 042	C-17A Communications and Navigation Systems Technician (5/7 Level)	317 FTD
2A1X3B 020	U-2R Avionics Communication/Navigation Maintenance Technician (Organization/Troubleshooting)	525 FTD
2A1X3C 004	Avionics Communication Technician (F/RF-4)	523 FTD
2A1X3C 007	Avionic Navigation Technician (AN/APX-76)(F/RF-4)	523 FTD
2A1X3C 013	Avionic Navigation Technician IFF Maintenance (F/RF-4)	523 FTD
2A4X3A-002	AN/APQ-120 Pulse Radar System , F-4E/G	523 FTD
2A4X2 003	AN/APM-420 Computer Logic Unit Test Set Operation and Maintenance	523 FTD
2A4X2 004	AN/APQ-120 Missile Firing System F-4E/G	523 FTD
2A4X2 006	AN/APQ-120 Weapons Control System Flt E-3	413 FTD
2A4X2 012	AN/APM-307(V)-6 Test Station Maintenance (F-4E/G)	523 FTD
2A4X2 013	WCS RADAR	523 FTD
75000 032	Training the Trainer	3785 FTW Sheppard AFB, TX
75000 034	Supervisors EST Course	3785 FTW Sheppard AFB, TX

**TYPE 6 TRAINING**  
**SPECIALTY TRAINING PACKAGES (STPS)**

L6AZS2E351 003	STP-TSEC/KI-1A, Limited Maintenance	342 TTS/CD Lackland AFB, TX
L6AZS2E351 005	STP-TSEC/KY-57/58, Limited Maintenance	342 TTS/CD Lackland AFB, TX
L6AZS2E351 006	STP-TSEC/KY-65/75, Limited Maintenance	342 TTS/CD Lackland AFB, TX
L6AZ530656 013 013	STP COMSEC Awareness Training	342 TTS/TTOX DSN 473-2957
E6AXU39130 000	Core Automated Maintenance System	330 TSS/TTTI Keesler AFB MS DSN 597-2985

**QUALIFICATION TRAINING PACKAGES (QTP)**

**COURSE NUMBER**

**COURSE TITLE**

**DEVELOPER**

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